(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

CORRECTED VERSION

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 September 2001 (27.09.2001)

PCT

(10) International Publication Number
WO 01/071627 A2

(51) International Patent Classification[7]: G06F 17/60, G07F 7/10, H04L 29/06

(21) International Application Number: PCT/US01/09136

(22) International Filing Date: 21 March 2001 (21.03.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/532,507 22 March 2000 (22.03.2000) US

(71) Applicant: QUALCOMM INCORPORATED [US/US]; 5775 Morehouse Drive, San Diego, CA 92121-1714 (US).

(72) Inventor: BLOW, Anthony, Talmage; 5511 Las Alturas Terrace, San Diego, CA 92114 (US).

(74) Agents: WADSWORTH, Philip, R. et al.; Qualcomm Incorporated, 5775 Morehouse Drive, San Diego, CA 92121-1714 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— with declaration under Article 17(2)(a); without abstract; title not checked by the International Searching Authority

(48) Date of publication of this corrected version:
27 December 2002

(15) Information about Corrections:
see PCT Gazette No. 52/2002 of 27 December 2002, Section II
Previous Correction:
see PCT Gazette No. 10/2002 of 7 March 2002, Section II

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A METHOD AND SYSTEM FOR WIRELESS ELECTRONIC COMMERCE USING A PORTABLE, WIRELESS COMMUNICATION DEVICE HAVING UNIQUE IDENTIFYING INFORMATION

(57) Abstract:

WO 01/071627 A2

A METHOD AND SYSTEM FOR WIRELESS ELECTRONIC COMMERCE USING A PORTABLE, WIRELESS COMMUNICATION DEVICE HAVING UNIQUE IDENTIFYING INFORMATION

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates generally to electronic commerce, and more particularly, to effecting a wireless electronic commerce transaction using a wireless communication device.

Related Art

Many commerce transactions require a consumer to be physically at or near a point-of-sale or point-of-transaction (POT) where the consumer exchanges money, or a money substitute, to pay for goods and/or services. Such transactions include, for example, purchasing goods or merchandise at a grocery or department store cash register, buying a meal at a restaurant, depositing money in a parking meter, and a cash exchange between two co-located individuals. In these transactions, a typically mobile consumer uses cash, a credit card, or a check as a medium of exchange or payment directly at the POT. Such forms of payment have certain disadvantages. For example, the cash, check and credit card are easily lost. The credit card, when lost, and even when not lost, is a frequent target of fraudulent use by unscrupulous individuals. Also, point-of-sale paper work involved with the credit card and check, and the additional personal identification (usually a driver's license) required to consummate a check transaction, can be a hassle.

Nowadays, the Internet provides a consumer with a rich medium for electronic commerce (herein referred to as e-commerce). A powerful Internet infrastructure, including a plethora of Internet service and support providers, provides the consumer with many beneficial services related to electronic commerce transactions. For example, a consumer can conveniently "shop" in the privacy of his or her own home using a relatively cheap personal computer connected with the Internet. Typically, the consumer purchases goods and/or service from a remote or distant e-commerce shopping partner, also connected with the Internet, by authorizing a credit payment to the shopping partner. Such e-commerce transactions are disadvantageously limited to the extent that the e-commerce shopping partner must be Internet accessible. In other words, the transaction requires a network connection between both partners in the transaction.

Hence, there is a need to effect a commerce transaction in such a way as to overcome the above mentioned disadvantages.

There is a further need to provide security in a commerce transaction to thereby protect the privacy of the transaction and the consumer effecting the transaction.

There is an even further need to effect an electronic commerce transaction between first and second partners and using a network such as the Internet, wherein only one of the partners requires network access.

There is a need to effect an electronic commerce transaction using the Internet, wherein a mobile consumer can be at or near a point-of-transaction, as required, to pay for goods and/or services or to receive payment from the point-of-transaction.

SUMMARY OF THE INVENTION

The present invention provides a method and system for effecting an e-commerce transaction, wherein a mobile subscriber/user initiates and controls the transaction at or near a local POT terminal using a portable Wireless Communication Device (WCD). An e-commerce support provider (ESP) computer connected with the Internet participates in and facilitates the e-commerce transaction. Using the WCD, the user electronically transfers user owned assets, such as money, credit, or bonus points, held in a remote consumer asset account, from the asset account to the POT terminal as payment for goods and/or services at the POT.

The WCD is uniquely identified by unique identifying information stored in the WCD. The WCD includes a first wireless interface for communicating with a wireless interface in the local POT terminal. First e-commerce transaction data is transmitted between the WCD and the POT terminal using the first wireless interface. The WCD includes a second wireless interface for communicating with the ESP computer. Encrypted second e-commerce transaction data generated as a function of the unique identifying information and the first e-commerce transaction data is transmitted between the WCD and the ESP computer connected with the Internet, using the second wireless interface of the WCD. The exchange of first and second e-commerce transaction data between the POT terminal, the WCD, and the ESP computer, results in the transfer of user assets between the POT terminal and the WCD necessary to effect the e-commerce transaction.

Features and advantages

The present invention advantageously preserves the mobility of a consumer in an e-commerce transaction, whereby the consumer can participate in the e-commerce transaction at or near a POT. The present invention permits the consumer to initiate and control an electronic transfer of consumer owned assets, such as money, to pay for goods and services at the POT. The present invention thereby avoids the need for and pitfalls associated with using conventional mediums of exchange, such as cash, a credit card, or a check.

The present invention advantageously provides Internet connectivity and support to a mobile user in an e-commerce transaction while adding a level of security and privacy to the transaction. Also, a POT terminal in accordance with the present need not be Internet accessible to participate in the e-commerce transaction.

The WCD of the present invention serves as a kind of "electronic wallet" that is convenient to carry, and private and secure in use.

BRIEF DESCRIPTION OF THE FIGURES

The foregoing and other features and advantages of the invention will be apparent from the following, more particular description of a preferred embodiment of the invention, as illustrated in the accompanying drawings.

FIG. 1 is an overview of a system for effecting an e-commerce transaction in accordance with the present invention

FIG. 2A is an illustration of exemplary memory buffer in the WCD of FIG. 1.

FIG. 2B is an exemplary format of an encrypted e-commerce transaction digital data packet exchanged between a WCD and an ESP computer of FIG. 1.

FIG. 2C is an exemplary format of an e-commerce transaction digital data packet exchanged between a WCD and a POT terminal of FIG. 1.

FIG. 3 is a block diagram of an embodiment of a logical architecture corresponding to the system of FIG. 1.

FIG. 4 is an e-commerce transaction process of corresponding to an e-commerce transaction in the system of FIG. 1.

FIG. 5 is an illustration of an encryption/decryption function of FIG. 3.

FIG. 6 is a block diagram of an arrangement for an electronic transfer of assets from a WCD to another WCD.

FIG. 7 is a block diagram of an arrangement for effecting an e-commerce transaction using a WCD capable of scanning merchandise bar codes.

FIG. 8 is a block diagram of an embodiment of the WCD of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 is an overview of a system 100 for effecting an e-commerce transaction in accordance with the present invention. In system 100, a subscriber/user 105 owns assets held in an asset account 110. User 105 initiates and controls an electronic transfer of assets between the asset account 110 and a POT terminal 115 using a portable WCD 120. Portable WCD 120 includes an input device 123 and a display device 124 enabling user 105 to participate in the e-commerce transaction via the WCD. In an example transaction where asset account 110 is a user bank

account, user 105 uses system 100 to electronically transfer money from his or her bank account 110 to POT terminal 115 to purchase goods or services at the POT terminal. In an alternative arrangement, the user electronically transfers assets in an opposite direction, that is, from POT terminal 115 to his or her bank account 110. In the e-commerce transaction of the present invention, POT terminal 115 and WCD 120 are relatively nearby or local to one another while asset account 110 is relatively distant or remote from both POT terminal 115 and WCD 120.

To facilitate the above mentioned electronic transfer of assets, system 100 includes an ESP computer 125 linked with a communication network 130. ESP computer 125, which can reside in an Internet support provider facility, preferably provides centralized, Internet processing support in many e-commerce transactions of the present invention. In the embodiment of FIG. 1, ESP computer 125 communicates with both WCD 120 and an e-commerce facility135, such as a bank, holding asset account 110, such that asset account is electronically accessible to ESP computer 125.

WCD 120 includes a first wireless interface for wirelessly communicating with a compatible wireless interface in POT terminal 115 over a short-range wireless communications link137. WCD 120 exchanges e-commerce transaction messages in the form of digital data packets with POT terminal 115 over short-range wireless communications link 137. WCD 120 also includes a second wireless interface for wirelessly communicating with ESP computer 125. WCD 120 is uniquely identified by unique identifying information stored in WCD 120, and also available to ESP computer 125. To maintain a required level of security and privacy in the e-commerce transaction, WCD 120 and ESP computer 125 exchange encrypted e-commerce transaction

messages, also in the form of digital data packets, generated as a function of the unique identifying information.

Since WCD 120 communicates wirelessly with both POT terminal 115 and ESP computer 125, system 100 advantageously permits user mobility in any e-commerce transaction of the present invention. Thus, portable WCD 120 conveniently functions as a kind of "electronic wallet" or "pocket book" because user 105 carries WCD 120 to the POT (that is, near to POT terminal 115) and uses WCD 120 as the conduit for a secure and private electronic transfer of money or other asset to or from POT terminal 115. Another advantage of the present invention is that POT terminal 115 can be a stand-alone electronic device, since POT terminal 115 need not be network accessible.

WCD 120 and ESP computer 125 communicate via 1) a wireless communication link 140 between the WCD and a communication network access device 145, such as a radio base station or the like, and 2) communication network 130. Communication network 130 encompasses the world wide packet data communications network commonly referred to as the Internet, local area networks, and the public switched telephone network. ESP computer 125 can be connected to the Internet via, for example, an Internet service provider 148. An Internet address corresponding to ESP computer 125 is stored in the memory of WCD 120, and an Internet address corresponding to WCD 120 is stored in a memory of ESP computer 125. This enables WCD 120 and ESP computer 125 to establish Internet connections between each other for the exchange of encrypted data packets during an e-commerce transaction.

As previously mentioned, ESP computer 125 also communicates with e-commerce facility 135, such as a bank, wherein asset account 110 is typically held. ESP computer 125 and e-commerce facility 135 communicate with each other via

communication network 130 and/or a dedicated communication link 152. In an alternative arrangement of system 100, asset account 110 is co-located with ESP computer 125, thus obviating the need for additional communications between ESP computer 125 and e-commerce facility 135.

In the present invention, WCD 120 and ESP computer 125 both include memory for storing the unique identification information associated with WCD 120. Such identification information includes an Electronic Serial Number (ESN), a Mobile Subscriber Number (MSN), and a user/subscriber access Personal Identification Number (PIN) or password. The ESN uniquely identifies WCD 120 and is programmed into the memory device of WCD 120 at a factory where WCD 120 is manufactured. The MSN also uniquely identifies WCD 120 and can serve as a network address of WCD 120. The user selects the PIN and enters the PIN into the memory buffer of WCD 120 using input device 123. The PIN thus serves as a password required for using WCD 120. WCD 120 and ESP computer 125 use the unique identification information to establish a network connection between each other, to uniquely identify each e-commerce transaction, and to generate the encrypted e-commerce transaction data packets.

An exemplary memory buffer 200 of WCD 120 for storing the unique identifying information of the WCD, is depicted in FIG. 2A. Memory buffer 200 includes memory locations 202, 204, 206 and 208 for respectively storing an ESN, an MSN, a PIN and an Internet address for ESP computer 125. A similar memory buffer resides in ESP computer 125, except that the memory buffer of ESP computer 125 includes an Internet address for WCD 120.

FIG. 2B is an exemplary format of an encrypted e-commerce transaction digital data packet 220 exchanged between WCD 120 and ESP computer 125. Packet 220 includes a message

type field 222, a WCD address field 224, and an encrypted data payload 226. Message type field 222 contains a message type specifier indicating a message type, such as a request, response or any other message type. WCD address field 224 includes a network address, such as an MSN (for example, the MSN of WCD 120), corresponding to the WCD that is either the originator or destination of the message in data packet 220. Data payload 226 includes the encrypted content of a message. Packet 220 also includes any additional fields required to support a particular application or communication protocol, such as an Internet communication protocol (IP). In the preferred embodiment, data packet 220 is further formatted in accordance with Internet communication protocols, such as an Internet Point-to-Point protocol (PPP) and TCP/IP.

FIG. 2C is an exemplary format of an e-commerce transaction digital data packet 230 exchanged between WCD 120 and POT terminal 115, over wireless link 137. Data packet 230 includes a header field 235 containing any header information required to support a particular application. Packet 230 also includes a data payload 240 containing the content of a message. The content of the message can be formatted as a simple ASCII character string, in the HyperText Markup Language (HTML), in the Wireless Markup Language (WML)(also known as the Hand held Devices Markup Language (HDML)), or in accordance with any other format, so long as a message received by WCD 120 can be displayed to user 105 by WCD 120, when necessary, and as described below.

FIG. 3 is an embodiment of a logical architecture corresponding to system 100. POT terminal 115, WCD 120 and ESP computer 125 each include memory and computer processing capability sufficient to host and execute software programs or applications required to support an e-commerce transaction.

WCD 120 hosts an e-commerce client application 300, including for example, a known browser application, and an e-commerce server application 325. ESP computer 125 hosts an ESP application 330, including new transaction, billing/accounting, and communication software applications. Also, WCD 120 and ESP computer 125 host complementary encryption/decryption functions 335 and 340, respectively, for generating the encrypted e-commerce transaction data packets mentioned in connection with FIG. 1, and for decrypting these encrypted packets. POT terminal 115 hosts an e-commerce application server 345 and is capable of electronically receiving assets, such as money, as payment for goods and/or services.

E-commerce client 300 of WDC 120 transmits request messages to and receives response messages from ESP application 330. E-commerce client application 300 also includes a user control interface for respectively displaying messages to and receiving e-commerce transaction control commands from user display device 124 and user input device 123 of WCD 120, thus allowing user 105 to participate in and control the e-commerce transaction. E-commerce client 300 transmits request messages to and receives response messages from e-commerce application server 345 in POT terminal 115. Messages received by e-commerce client application 300 can be displayed to the user device as and when appropriate. For example, an HTML or HDML command sequence transmitted by POT terminal 115 can be displayed by client 300, as is done with known browser applications.

An e-commerce transaction process of the present invention is depicted in FIG. 4. FIG. 4 corresponds to an e-commerce transaction in the system of FIG. 1. The process begins at a step 402 when user 105 initiates the e-commerce transaction using WCD 120, for example, by pressing a start key or the like on

the WCD. At a step 405, WCD 120 transmits a request message to POT terminal 115 requesting POT terminal specific e-commerce information from the POT terminal. At a step 410, POT terminal 115 transmits a response message including the specific e-commerce information to WCD 120. At a step 415, WCD 120 receives the response message. WCD 120 displays necessary information relating to and/or received from POT terminal 115 to user 105 and prompts the user for input if necessary. WCD 120 accepts information and/or commands entered by user 105 via input device 123 of WCD 120.

At a step 420, WCD 120 generates an encrypted request message based on or as a function of some or all of the information and/or commands received from POT terminal 115 and user 105, and using the unique identification information associated with the WCD. A typical encrypted request message, in accordance with the format of message 220, includes a "request" message type specifier in message type field 222, the MSN of WCD 120 in address field 224, and an encrypted message as payload 226. One or more of the MSN, ESN and PIN of WCD 120 are used to generate encrypted payload 226. WCD 120 transmits the encrypted request message to ESP computer 125.

At a step 425, ESP computer 125 receives the encrypted request message, verifies the address in field 224, and decrypts the encrypted message using the same unique identification information, for example the ESN, MSN, and/or PIN, as was used to encrypt the message in step 420. Next, at a step 427, ESP computer 125 establishes communications with remote e-commerce facility 135 to verify/validate the e-commerce transaction in real-time, that is, right away, and in relation to user asset account 110 held at the e-commerce facility. For example, ESP computer 125 validates the e-commerce transaction by

verifying there are sufficient assets in asset account 110 to satisfy an asset amount requested in the request message from WCD 120.

In one exemplary verification/validation process, ESP computer 125 transmits the MSN (and PIN if required) to e-commerce facility 135. In turn, e-commerce facility 135 identifies user asset account 110 using the MSN (and PIN if required). This being done, ESP computer 125 solicits an "approval" from e-commerce facility 135 indicating there are sufficient funds available in asset account 110 to satisfy or "cover" an asset amount requested in the request message from WCD 120, that is necessary to complete the e-commerce transaction at the POT terminal.

At a step 430, ESP computer 125 generates an encrypted verification/validation response message using the same unique identification information as was used in step 420, and transmits the message to WCD 120. The response message indicates whether the e-commerce transaction is approved. At a step 435, after receiving the verification/validation response message, WCD 120 transmits a message including required assets to POT terminal 115 if the received verification/validation response message indicates an approved or validated e-commerce transaction. At a step 440, after further communication between ESP computer 125 and facility 135, asset account 110 is debited to reflect the consummated e-commerce transaction, that is, the electronic transfer of user owned assets from asset account 110 to POT terminal 115.

With regard to the user PIN, different levels of security are advantageously provided in the present invention. For example, WCD 120 can provide the user with a menu of security options. Such options, when selected, can require the user to enter the PIN 1) before every e-commerce transaction, 2) periodically, for example, every X hours (where X is 1, 2 etc.), 3) upon powering on WCD, or 4) when the e-commerce transaction involves at least a

predetermined amount of assets or money. Such security features decrease the chances of any fraudulent use of WCD 120 in an e-commerce transaction.

FIG. 5 is an illustration of encryption/decryption function 335 of FIG. 3. Encryption/decryption functions 335 and 340 are the same, and therefor, a description of one suffices for the other. Encryption/decryption function 335 includes an encryption sub-function 500 for encrypting transaction data 505 with unique identification information 510, to generate encrypted e-commerce transaction data 515. Encryption sub-function 500 uses any known encryption algorithm providing the level of security and privacy required for the e-commerce transaction, so long as the unique identification information of WCD 120 can be used to encrypt the transaction data 505. Exemplary encryption/decryption protocols useable in the present invention include, but are not limited to, the Data Encryption Standard (DES) encryption protocol, and the Pretty Good Privacy (PGP) protocol commonly used to encrypt electronic mail and Internet files.

Encrypted data 515 generated by encryption sub-function 500 represents payload 226 of message 220. Transaction data 505 is based on information received from POT terminal 115 and user input at WCD 120. Unique identification information 510 includes at least one of the MSN, ESN and PIN associated with WCD 125. Encryption/decryption function 335 also includes a decryption sub-function 520 for decrypting encrypted transaction data 525 with unique identification information 510, to generate decrypted e-commerce transaction data 530.

In the following exemplary "parking meter" e-commerce transaction, POT terminal 115 is a parking meter capable of accepting electronic money deposits transmitted to the meter by WCD 120. User 105 initiates the parking meter e-commerce

transaction by depressing the start key of WCD 120 when the user (carrying WCD 120) is within a wireless communication range of parking meter 115. In response, WCD 120 requests parking meter specific information from parking meter 115. Parking meter 115 responds with an exemplary message:

METER202398981:

THIS METER COSTS $0.25 an hour, PAY?

This message, once received by WCD 120, is displayed to user 105 via the WCD display device. User 105 responds by depressing a WCD key indicating "YES ", the user wishes to pay for an hour of parking. In response to the "YES" key being depressed, WCD 120 transmits an encrypted request to ESP 125 for approval to transfer $0.25 from user bank account 110 to the parking meter. Assuming a bank account balance of greater than $0.25 in bank account 110, bank facility 135 approves the transfer, and in turn, ESP 125 transmits an encrypted approval message to WCD 120. After receiving the approval message, WCD 120 transmits a message including a $0.25 monetary transfer to parking meter 115 to complete the transaction and to pay for one hour of parking. After the transaction is complete, ESP 125 reestablishes communication with facility 135 to thereby debit bank account 110 by $.25.

In the following exemplary "restaurant-based" e-commerce transaction, POT terminal 115 resides in a restaurant and stores restaurant specific information such as a food and beverage menu with associated prices. In this example, user 105 again initiates the e-commerce transaction by depressing the start key of WCD 120 when in communication range of POT terminal 115. In response to the request transmitted by WCD 120, restaurant POT terminal 115 transmits a response message to the WCD 120. The response message includes the food and beverage menu and associated prices. This information is displayed to user 105 at

WCD 120. User 105 selects desired items from the displayed menu via input device 123 of WCD 120. WCD 120 automatically calculates a total cost of the selected items (including a designated tip if the user so desires), and transmits an encrypted message to ESP computer 125 for approval of this total cost amount. If ESP computer 120 approves the transaction, WCD 120 transmits an electronic payment to POT terminal 115 at the restaurant.

The e-commerce transactions described above each involve an electronic transfer of assets, such as money, from WCD 120 to POT terminal 115 at the POT. However, it should be appreciated that POT terminal 115 can be a second WCD, whereby assets are transferred electronically from WCD 120 to the second WCD. FIG. 6 is a block diagram of an arrangement 600 for such an electronic transfer of assets from WCD 120 to a WCD 605. Arrangement 600 is similar to the arrangement described in connection with system 100, except WCD 605 replaces POT terminal 115. Arrangement 600 also includes ESP computer 610 and an e-commerce facility 612, for supporting an e-commerce transaction effected using WCD 605. A user 615 owns assets in an asset account 620 held by e-commerce facility 612. WCD 605, ESP 610 and e-commerce facility 612 inter-communicate in the same manner that WCD 120, ESP 125, and e-commerce facility 135 inter-communicate.

In arrangement 600, user 615 can initiate and control an electronic transfer of assets from asset account 620 to asset account 110 using WCD 605. An exemplary transfer, wherein asset accounts 620 and 110 are bank accounts, includes the electronic transfer of money from bank account 620 to bank account 110, as now described. When user 615 initiates such a transaction at WCD 605, WCD 605 transmits an initial request to WCD 120. In response, e-commerce server application 325 of WCD 120 (see FIG. 3) generates a response message identifying WCD 120. Next,

at WCD 605, user 615 enters a dollar amount that is to be transferred from account 620 to account 110. Next a transfer of this amount is verified/validated by ESP 610 and e-commerce facility 612 in the same manner as described above in connection with FIG. 4. After such validation, WCD 605 transmits a message to WCD 120 electronically transferring the entered dollar amount to WCD 120. Finally, the account balances of asset accounts 620 and 110 are respectively debited and credited by the dollar amount transferred between the accounts to reflect the e-commerce transaction.

FIG. 7 is a block diagram of another arrangement 700 of the present invention for effecting an e-commerce transaction using a WCD 705 capable of scanning a merchandise bar code associated with a merchandise item 710. WCD 705 is interconnected with an ESP computer and bank facility as described above, but not shown in FIG. 7. The first wireless interface of WCD 705, that is, the short range wireless interface, includes a known bar code reader 715. Bar code reader 715 is any known bar code reader capable of reading or scanning a bar code 720, such as a UPC label, associated with merchandise item 710. When the user of WCD 705 scans UPC label 720 with reader 715, WCD 705 acquires a purchase price and an identification code corresponding to merchandise item 710, and stores this information to a memory buffer of WCD 705. As the user scans additional merchandise items while shopping, WCD 705 accumulates a total purchase price in, and adds additional identification codes to, the memory buffer. When the user is done shopping and wishes to pay for the scanned items, the user carries WCD 705 to a POT terminal capable of receiving an electronic transfer of money from WCD 705. The user then initiates a payment process as described in connection with FIG. 4 to pay for the scanned merchandise items at the POT terminal.

In the exemplary e-commerce transactions described above, asset account 110 is a bank account holding money, and money is electronically transferred to/from the bank account. However, asset account 110 can hold other, electronically transferrable, non-monetary assets. For example, asset account 110 can hold electronic coupons, credit points or bonus points cumulatively earned whenever user 105 makes a purchase either in accordance with the present invention, or that is not necessarily in accordance with the present invention. Such coupons, credit points or bonus points can then be applied to subsequent purchases made in accordance with the present invention, wherein the non-monetary assets are electronically transferred to a POT terminal, instead of money. Also, these non-monetary assets can be held in a second or third asset account owned by user 105 in addition to asset account 110. Asset account 110 can also be a credit account, such as a credit card account, for transferring credit to the POT terminal in the e-commerce transaction, thereby obviating the need for a credit card in a credit transaction.

FIG. 8 is a block diagram of an embodiment of WCD 120. WCD 120 has a compact, hand-held form factor similar to that of a personal digital assistant or cellular telephone. The functionality of WCD 120 can be integrated with the functionality of a wireless or cellular telephone so that WCD 120 can be used as both a cellular phone and to effect e-commerce transactions. WCD 120 includes a bus 802 or other communication mechanism for communicating information, and a processor 804 coupled with the bus 802 for processing information. WCD 120 also includes a main memory 806, such as a random access memory (RAM) or other dynamic storage device, coupled to the bus 802 for storing information and instructions to be executed by processor 804. Main memory 806 also may be used for storing temporary variables or other intermediate information during execution of

instructions to be executed by processor 804. WCD 120 further includes a read only memory (ROM) 808 or other static storage device coupled to the bus 802 for storing static information and instructions for the processor 804. A storage device 810, such as a magnetic disk or optical disk, is provided and coupled to the bus 802 for storing information and instructions.

WCD 120 includes display 124, such as a flat panel display, for displaying information to a user. Display 124 is coupled to bus 802. Input device 123, including alphanumeric and other keys, is coupled to bus 802 for communicating information and command selections to the processor 804. Another type of user input device is a cursor control 816, such as a mouse, a trackball, or cursor direction keys for communicating direction information and command selections to processor 804 and for controlling cursor movement on display 124.

Initiation and control of the e-commerce transaction is provided by WCD 120 in response to processor 804 executing sequences of instructions contained in main memory 806. Such instructions may be read into main memory 806 from another computer-readable medium, such as a storage device 810. Execution of the sequences of instructions contained in the main memory 806 causes the processor 804 to perform the process steps described above in connection with FIG. 4 and the exemplary e-commerce transactions described above. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with computer software instructions to implement the invention. Thus, embodiments of the invention are not limited to any specific combination of hardware circuitry and software.

WCD 120 includes a short range, wireless communication interface (I/F) 820 coupled to bus 802. Communication I/F 820 corresponds to the "first interface" mentioned in connection with FIGs. 1 and 7. As described above, communication I/F 820

provides bi-directional wireless data communication with the compatible wireless communication I/F of POT terminal 115, over wireless communication link 137. Communication I/F 820 includes a transceiver for transmitting and receiving data over wireless communication link 137, and a micro-controller for controlling the communication interface. The micro- controller can be integrated with processor 804, and executes program instructions or the like to implement the functionality of the communication I/F including any required data communication protocols. To support alternative arrangement 700 described in connection with FIG. 7, communication I/F 820 can optionally include a known bar code reader.

In the present invention, wireless communication I/F 820 supports digital data packet exchanges between WCD 120 and POT terminal 115, and as such, can be implemented in accordance with exemplary specifications for short-range wireless communications, such as "Bluetooth" and/or Infrared Data Association (IrDA) specifications, or any other suitable specification, so long as a compact communication I/F 820 can comply with the specification requirements. Bluetooth is a proposed radio frequency (RF) specification for short-range, point-to-multipoint data transfer. Bluetooth radio links, operating in the 2.4 gigahertz Industrial-Scientific-Medical (ISM) frequency band, have a nominal communication range between 10 centimeters and 10 meters. However, this nominal range can be extended to 100 meters by increasing the transmit power of a Bluetooth transmitter in communication I/F 820. The IrDA specification provides for wireless data exchanges using a short-range infrared wireless link. Accordingly, a typical distance between WCD 120 and POT terminal 115 during an e-commerce transaction is ten meters or less, unless an extended range transmitter is used in each device.

WCD 120 also includes a wireless network communication I/F 822. Network communication I/F 822 corresponds to the "second interface" mentioned in connection with FIG. 1, and supports the wireless exchange of digital data packets between WCD 120 and network access device 145, as described above. Wireless network communication I/F 822 incorporates a wireless transceiver and a micro-controller similar to the type used in cellular telephony devices for communicating between a cellular telephone and a distant base station. In the preferred embodiment, network communication I/F 822 communicates with network access device 145 using a code division multiple access (CDMA) communication protocol.

It should be understood that POT terminal 115 includes a wireless I/F compatible with wireless I/F 820 of WCD 120. POT terminal 115 also includes a processor and memory sufficient to host and execute server application 345.

While various embodiment of the present invention have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of the present invention should not be limited by any of the above-described exemplary embodiments and arrangements, but should be defined only in accordance with the following claims and their equivalents.

WHAT IS CLAIMED IS:

CLAIMS

1. A method of effecting a wireless electronic commerce (e-commerce) transaction between a wireless communication device and a point-of-transaction (POT) terminal, comprising:

(a) associating unique identifying information with the wireless communications device;

(b) wirelessly transmitting first e-commerce transaction data between the wireless communications device and the POT terminal; and

(c) wirelessly transmitting second e-commerce transaction data generated as a function of the unique identifying information and the first e-commerce transaction data, from the wireless communications device to a service provider.

2. The method of claim 1, wherein the service provider provides an e-commerce support service to a subscriber having a subscriber asset account electronically accessible to the service provider and remote from both the wireless communications device and the POT terminal, further comprising

effecting a transfer of assets between the subscriber asset account and the POT terminal via the first e-commerce transaction data, the second e-commerce transaction data, and the wireless communications device; and

increasing and decreasing assets in the asset account to reflect the transfer of assets in the e-commerce transaction.

3. The method of claim 2, wherein the subscriber asset account is a subscriber bank account, further comprising

electronically transferring a monetary fund amount from the bank account to the POT terminal; and

determining the monetary fund amount as a function of the first e-commerce transaction data and transaction control commands entered via the wireless communications device to control the transaction.

4. The method of claim 1, wherein step (b) includes

transmitting a request message from the wireless communications device to the POT terminal requesting transaction information from the POT terminal; and

receiving a response message from the POT terminal at the wireless communication device, the response message including the transaction information requested from the POT terminal.

5. The method of claim 4, wherein step (b) further includes transmitting the first e-commerce transaction data over a short-range, wireless communication link in accordance with one of a Bluetooth data transmission protocol, an IrDA data transmission protocol, and a proprietary data transmission protocol.

6. The method of claim 1, further comprising

establishing a wireless network link between the wireless communications device and the service provider in response to receipt of the first e-commerce transaction data at the wireless communications device; and

transmitting the second e-commerce transaction data over the wireless network link using a packet data protocol compatible with an Internet packet data protocol.

7. The method of claim 1, wherein the unique identification information includes at least one of a subscriber personal identification number, a mobile subscriber number, and an electronic serial number, and wherein step (c) includes encrypting

e-commerce transaction data at the wireless communication device using the unique identification information to generate the second e-commerce transaction data.

8. The method of claim 1, further comprising

displaying information relating to the first transaction data at the wireless communications device; and

entering commands via the wireless communications device to initiate and control the e-commerce transaction.

9. A system for effecting a wireless electronic commerce (e-commerce) transaction, comprising:

a wireless communications device having unique identifying information;

a local wireless interface in said wireless communications device for communicating with a wireless interface at a point-of-transaction (POT) terminal;

means for transmitting first e-commerce transaction data between the wireless interfaces; and

means for transmitting second e-commerce transaction data generated as a function of the unique identifying information and the first e-commerce transaction data from said wireless communications device to a service provider.

10. The system of claim 9, further comprising a support computer at the service provider for providing an e-commerce support service to a subscriber having a subscriber asset account electronically accessible to the support computer and remote from both the wireless communications device and the POT terminal, wherein assets are transferred between the subscriber asset account and the POT terminal via the first e-commerce transaction data, the second e-commerce transaction data, and the wireless

communications device, the support computer including means for increasing and decreasing assets in the asset account to reflect the transfer of assets in the e-commerce transaction.

11. The system of claim 10, further comprising

means for electronically transferring a monetary fund amount from a subscriber bank account to the POT terminal; and

means for determining the monetary fund amount transferred based on the e-commerce first transaction data and transaction control commands entered via the wireless communications device to control the transaction.

12. The system of claim 9, wherein said means for transmitting first e-commerce transaction includes

means in the wireless communication device for transmitting a request message from the wireless communications device to the POT terminal requesting transaction information from the POT terminal; and

means in the wireless communication device for receiving a response message including the requested transaction information from the POT terminal.

13. The system of claim 12, wherein said wireless interfaces include means for transmitting the first e-commerce transaction data over a short-range, wireless communication link in accordance with one of a Bluetooth, an IrDA, and a proprietary data packet transmission protocols.

14. The system of claim 9, wherein the wireless communication device further comprises

means for establishing a wireless network link with the service provider in response to receipt of the first e-commerce transaction data at the wireless communications device; and

means for transmitting the second transaction data over the wireless network link using a packet data protocol compatible with an Internet packet data protocol.

15. The system of claim 9, wherein the wireless communication device further comprises means for encrypting e-commerce transaction data as a function of the personal identification number to generate the second transaction data, wherein the unique identification information includes at least one of a subscriber personal identification number, a mobile subscriber number, and an electronic serial number of the wireless communication device.

16. The system of claim 9, wherein the wireless communication device further comprises

means for displaying information relating to the first transaction data; and

means for entering commands to initiate and control the e-commerce transaction.

17. A system for effecting a wireless electronic commerce (e-commerce) transaction, comprising:

an e-commerce support computer at a service provider for providing an e-commerce support service to at least one subscriber having a subscriber asset account electronically accessible to the e-commerce support computer;

a point-of-transaction (POT) terminal having a wireless interface;

a wireless communications device having

unique identifying information, and including

a wireless interface for communicating with the first wireless interface of the POT terminal,

means for transmitting first e-commerce transaction data between the wireless interfaces of the wireless communication device and the POT terminal; and

means for transmitting second e-commerce transaction data generated as a function of the unique identifying information and the first e-commerce transaction data between the wireless communications device and the e-commerce support computer.

18. The system of claim 17, wherein the subscriber asset account is remote from both the wireless communications device and the POT terminal, and wherein assets are transferred between the subscriber asset account and the POT terminal via the first e-commerce transaction data, the second e-commerce transaction data, and the wireless communications device, the e-commerce support computer including means for increasing and decreasing assets in the asset account to reflect the transfer of assets in the e-commerce transaction.

19. The system of claim 17, wherein said means for transmitting first e-commerce transaction in the wireless communication device includes

means for transmitting a request message from the wireless communications device to the POT terminal requesting transaction information from the POT terminal; and

means in the wireless communication device for receiving a response message including the requested transaction information from the POT terminal, and wherein

said POT terminal includes means for receiving the request message and means for formulating and transmitting the response message.

20. The system of claim 17, wherein both the wireless communication device and the e-commerce support computer further comprise means for encrypting e-commerce transaction data as a function of unique identification information to generate the second transaction data, wherein the unique identification information includes at least one of a subscriber personal identification number, a mobile subscriber number, and an electronic serial number of the wireless communication device.

21. A computer program product comprising computer usable media having computer readable program code means embodied in said media for causing application programs to execute on computer processors in a wireless communication device, in a point-of-transaction terminal, and in an electronic commerce (e-commerce) support computer at a service provider, to effect an e-commerce transaction, said computer readable program code means comprising:

a first computer readable program code means for causing the processor to associate unique identifying information with the wireless communications device;

a second computer readable program code means for causing the processor to wirelessly transmit first e-commerce transaction data between the wireless communications device and the POT terminal; and

a third computer readable program code means for causing the processor to wirelessly transmit second e-commerce transaction data generated as a function of the unique identifying information and the first e-commerce transaction data, from the

wireless communications device to the e-commerce support computer.

22. The computer program product of claim 21, wherein the second program code means includes computer readable program code means for causing the processor to encrypt e-commerce transaction data as a function of the personal identification number to generate the second transaction data, wherein the unique identification information includes at least one of a subscriber personal identification number, a mobile subscriber number, and an electronic serial number of the wireless communication device.

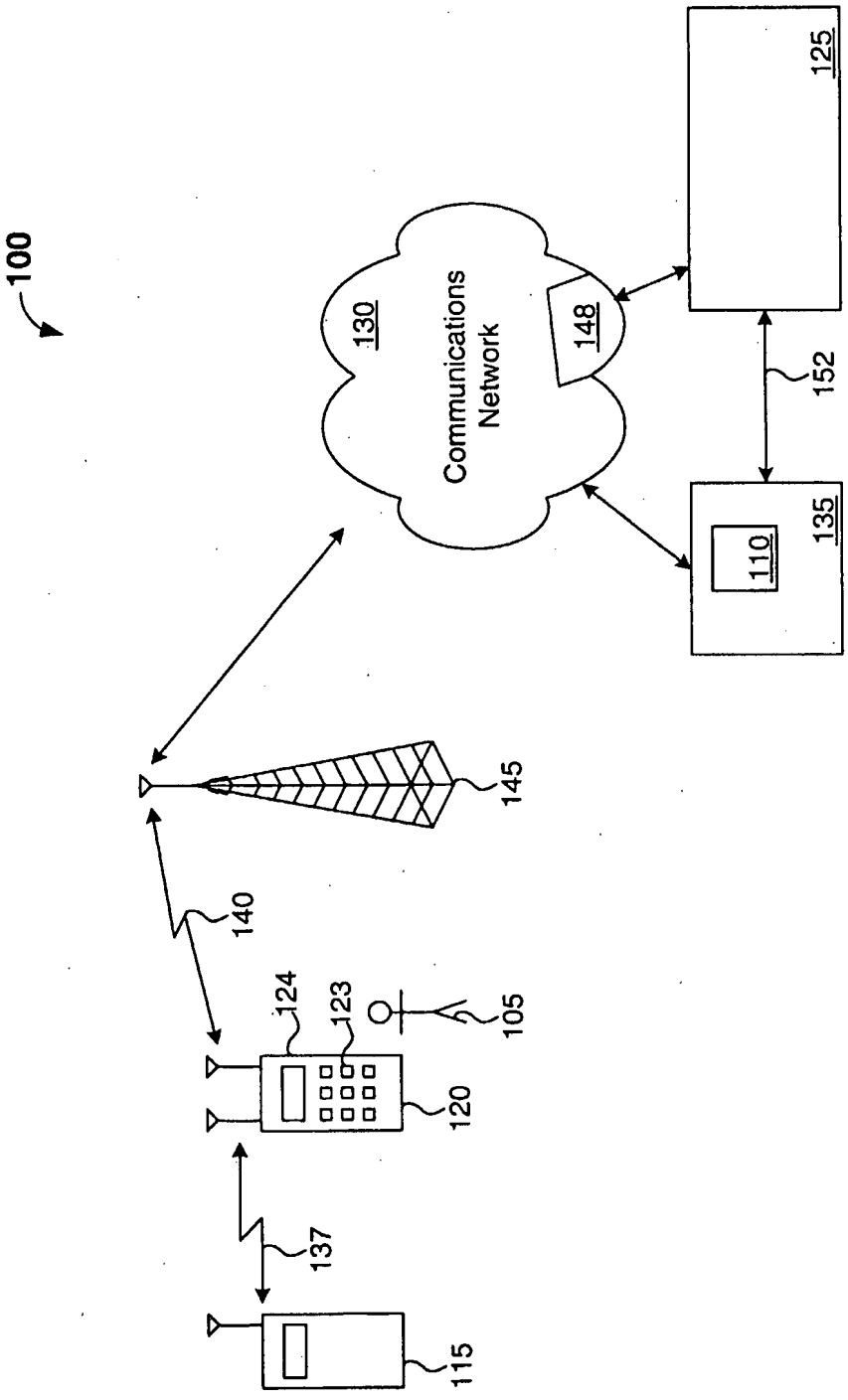
100
130
Communications Network
148
125
152
135
110
145
140
124
123
105
120
137
115

FIG. 1

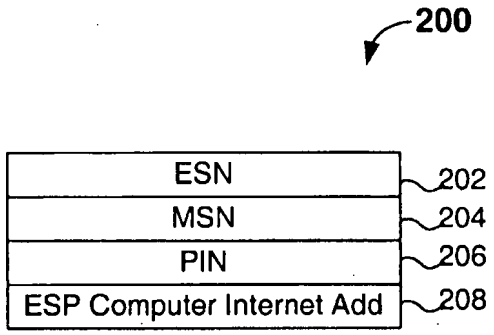

FIG. 2A

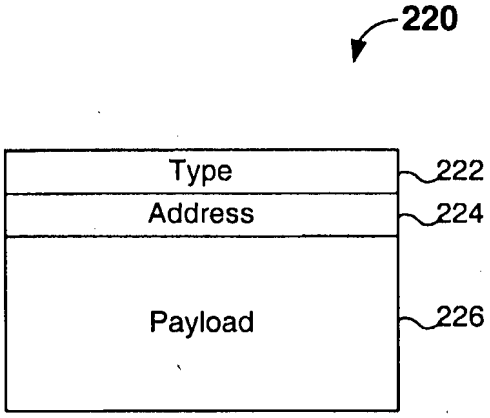

FIG. 2B

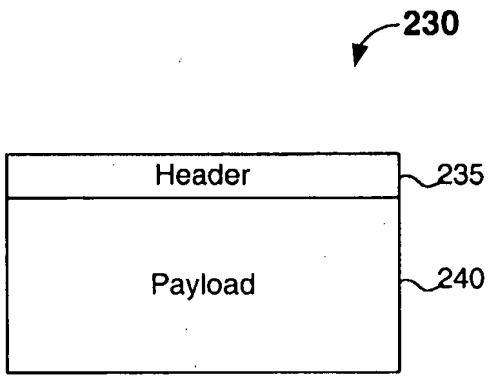

FIG. 2C

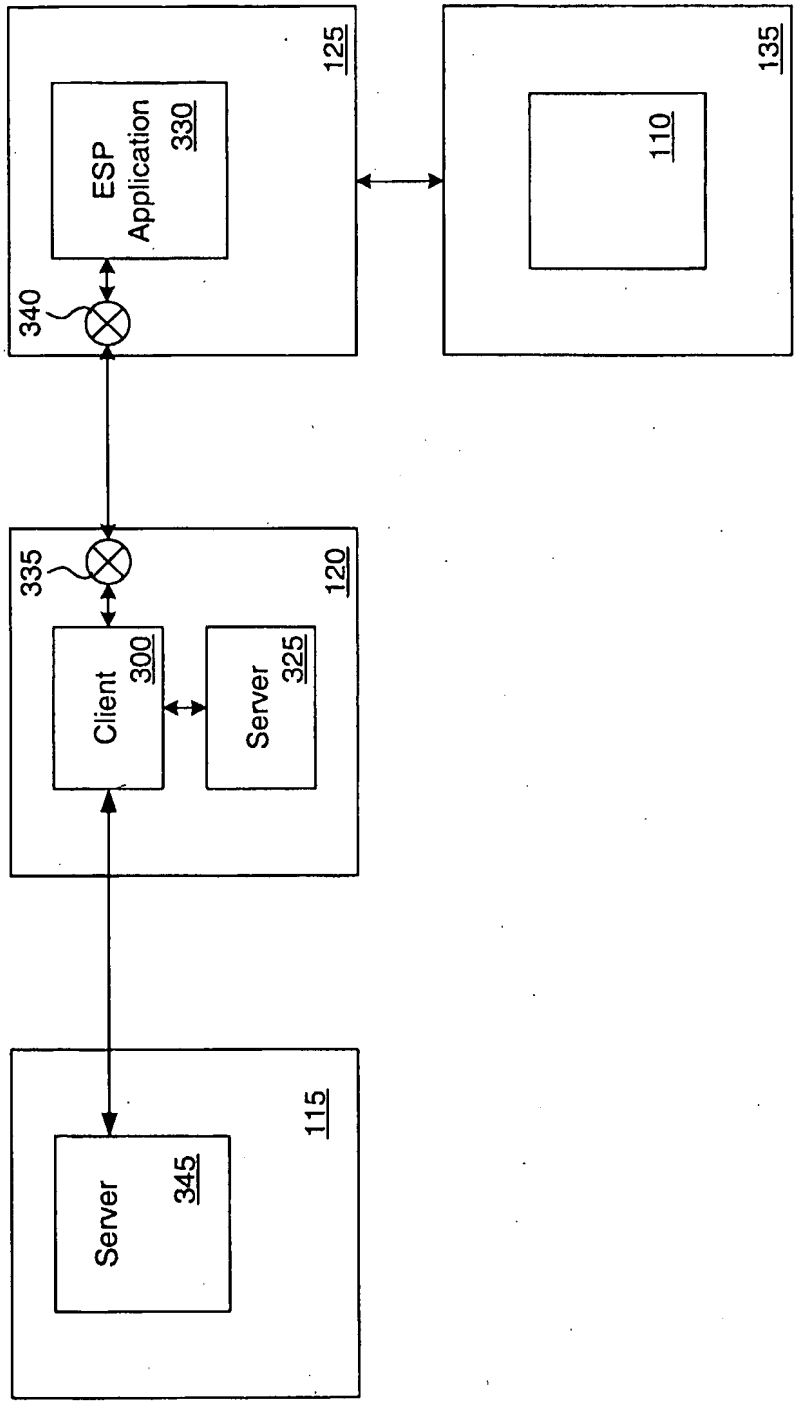
125
ESP Application 330
340
135
110
335
120
Client 300
Server 325
115
Server 345

FIG. 3

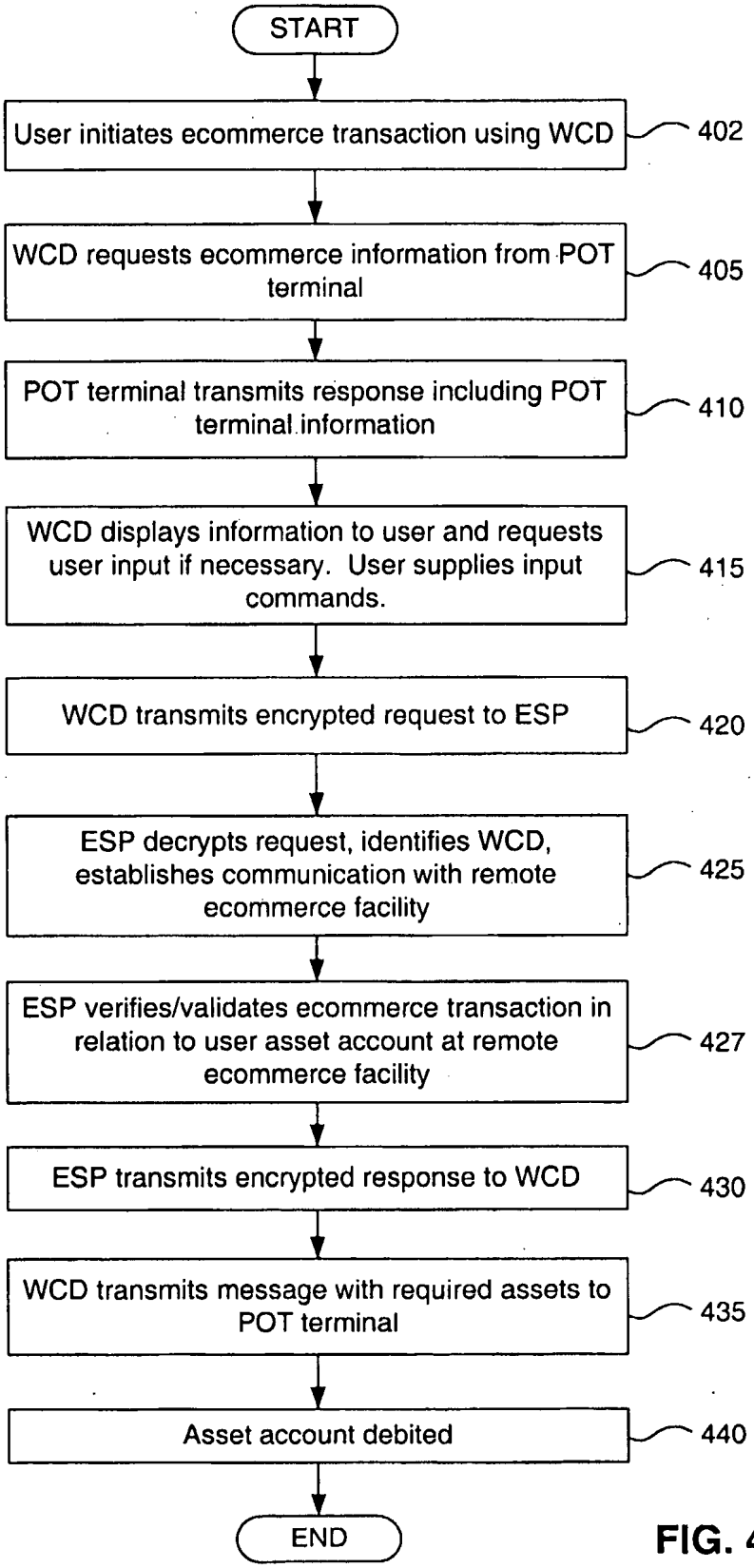
START
User initiates ecommerce transaction using WCD
402
WCD requests ecommerce information from POT terminal
405
POT terminal transmits response including POT terminal information
410
WCD displays information to user and requests user input if necessary. User supplies input commands.
415
WCD transmits encrypted request to ESP
420
ESP decrypts request, identifies WCD, establishes communication with remote ecommerce facility
425
ESP verifies/validates ecommerce transaction in relation to user asset account at remote ecommerce facility
427
ESP transmits encrypted response to WCD
430
WCD transmits message with required assets to POT terminal
435
Asset account debited
440
END

FIG. 4

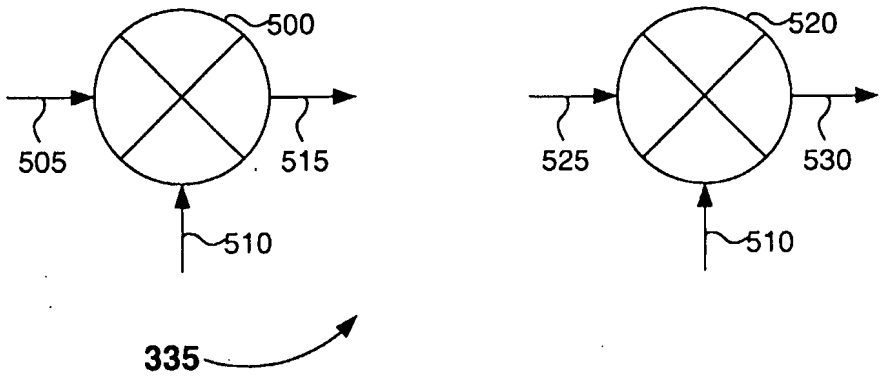

FIG. 5

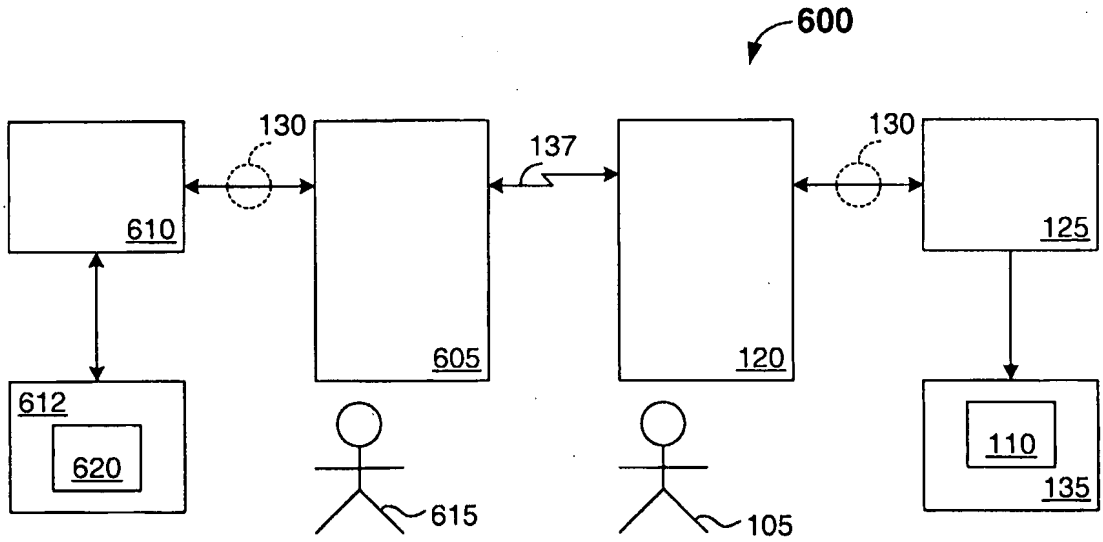

FIG. 6

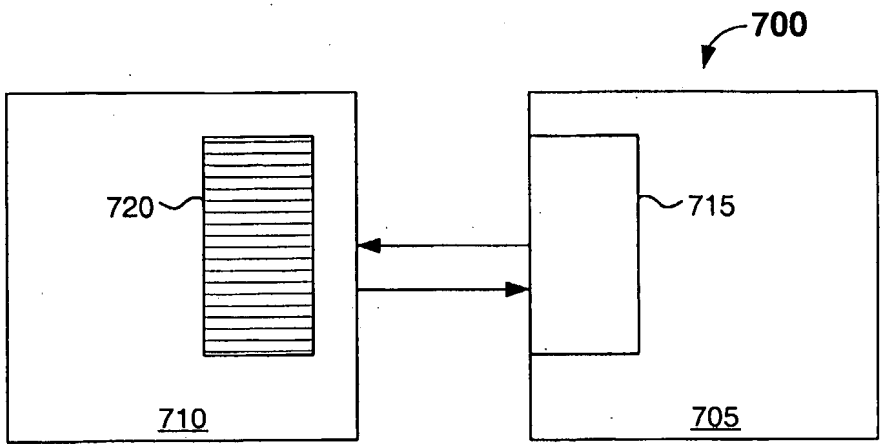

FIG. 7

SUBSTITUTE SHEET (RULE 26)

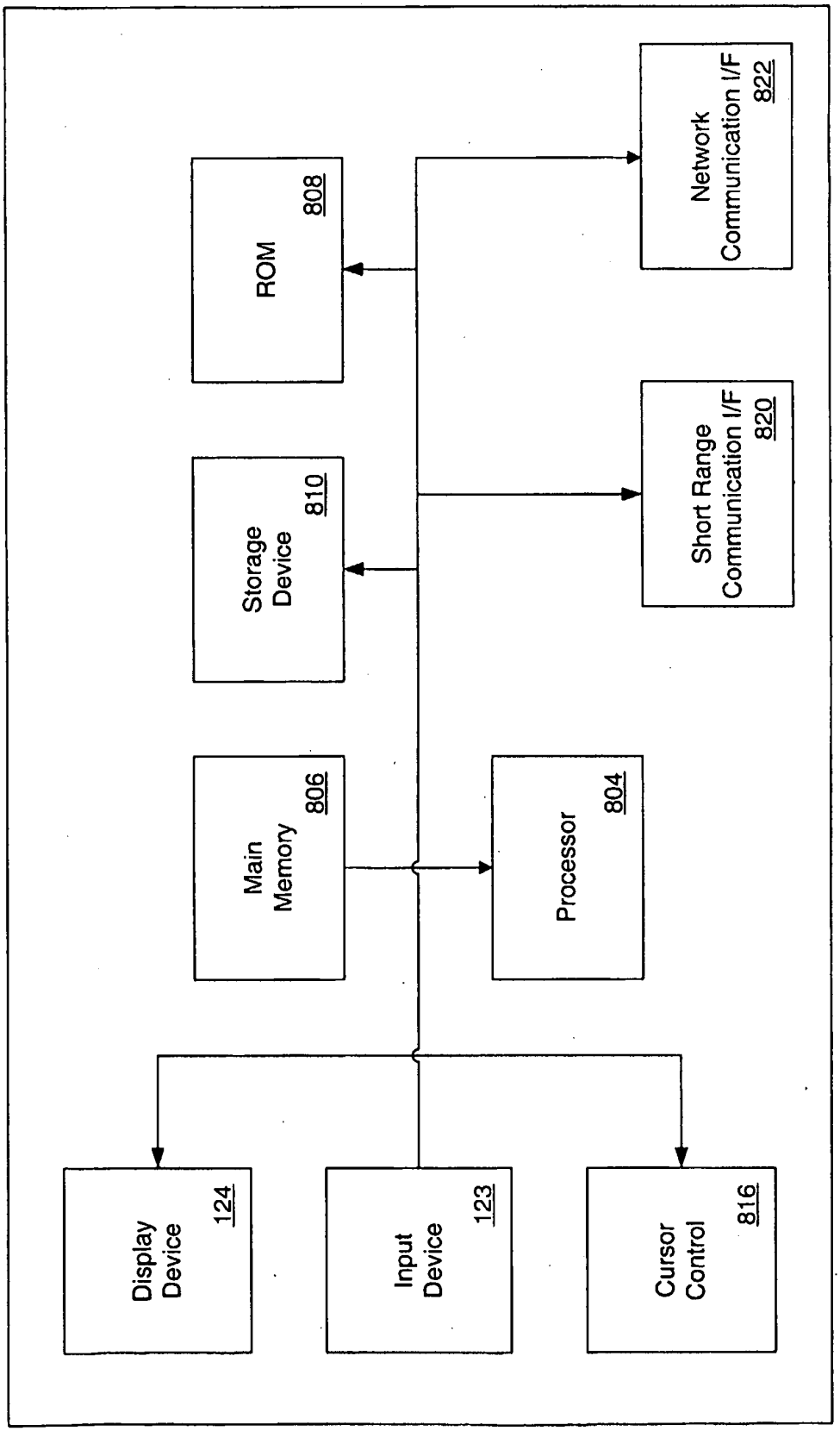
Network Communication I/F 822
ROM 808
Short Range Communication I/F 820
Storage Device 810
Main Memory 806
Processor 804
Display Device 124
Input Device 123
Cursor Control 816

FIG. 8

PATENT COOPERATION TREATY

PCT

DECLARATION OF NON-ESTABLISHMENT OF INTERNATIONAL SEARCH REPORT

(PCT Article 17(2)(a), Rules 13ter.1(c) and Rule 39)

Applicant's or agent's file reference	IMPORTANT DECLARATION	Date of mailing *(day/month/year)*
990560PCT		21/11/2001
International application No.	International filing date *(day/month/year)*	(Earliest) Priority date *(day/month/year)*
PCT/US 01/09136	21/03/2001	22/03/2000
International Patent Classification (IPC) or both national classification and IPC	G06F17/60, G07F7/10, H04L29/06	
Applicant		
QUALCOMM INCORPORATED		

This International Searching Authority hereby declares, according to Article 17(2)(a), that **no international search report will be established** on the international application for the reasons indicated below

1. [X] The subject matter of the international application relates to:
   - a. [ ] scientific theories.
   - b. [ ] mathematical theories
   - c. [ ] plant varieties.
   - d. [ ] animal varieties.
   - e. [ ] essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes.
   - f. [X] schemes, rules or methods of doing business.
   - g. [ ] schemes, rules or methods of performing purely mental acts.
   - h. [ ] schemes, rules or methods of playing games.
   - i. [ ] methods for treatment of the human body by surgery or therapy.
   - j. [ ] methods for treatment of the animal body by surgery or therapy.
   - k. [ ] diagnostic methods practised on the human or animal body.
   - l. [ ] mere presentations of information.
   - m. [ ] computer programs for which this International Searching Authority is not equipped to search prior art.

2. [X] The failure of the following parts of the international application to comply with prescribed requirements prevents a meaningful search from being carried out:
   - [ ] the description
   - [X] the claims
   - [ ] the drawings

3. [ ] The failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions prevents a meaningful search from being carried out:
   - [ ] the written form has not been furnished or does not comply with the standard.
   - [ ] the computer readable form has not been furnished or does not comply with the standard.

4. Further comments: see attached sheet

Name and mailing address of the International Searching Authority	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Stylianos Vasilakis

Form PCT/ISA/203 (July 1998)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 203

The claims relate to subject matter for which no search is required according to Rule 39 PCT. Given that the claims are formulated in terms of such subject matter or merely specify commonplace features relating to its technological implementation, the search examiner could not establish any technical problem which might potentially have required an inventive step to overcome. Hence it was not possible to carry out a meaningful search into the state of the art (Art. 17(2)(a)(i) and (ii) PCT; see Guidelines Part B Chapter VIII, 1-6).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.